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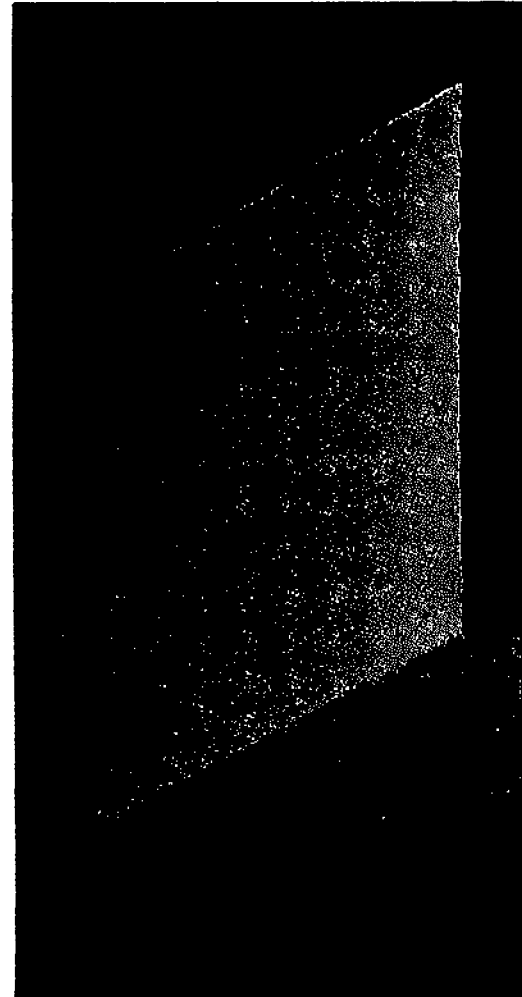
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BY MARK HAYWARD

An interface combining two mainframe-based systems gives viable options to the design and implementation of ad hoc reporting systems

DB2 In Focus



JUDGING FROM MY experience, a satisfactory design can rarely be accomplished using only one product or technique. More often than not, the design of an information system involves the combination of various products.

This article discusses the combination of two mainframe-based products, Information Builders Inc.'s (IBI) Focus and IBM's DB2, as an implementation platform for decision support applications. I will explain the operation of IBI's Focus/DB2 interface and the surprising—in some cases—synergy of the two products. Not only do I hope to help you evalu-

ate the Focus/DB2 interface, but the discussion should also give insight into the larger area of decision support application development with Focus.

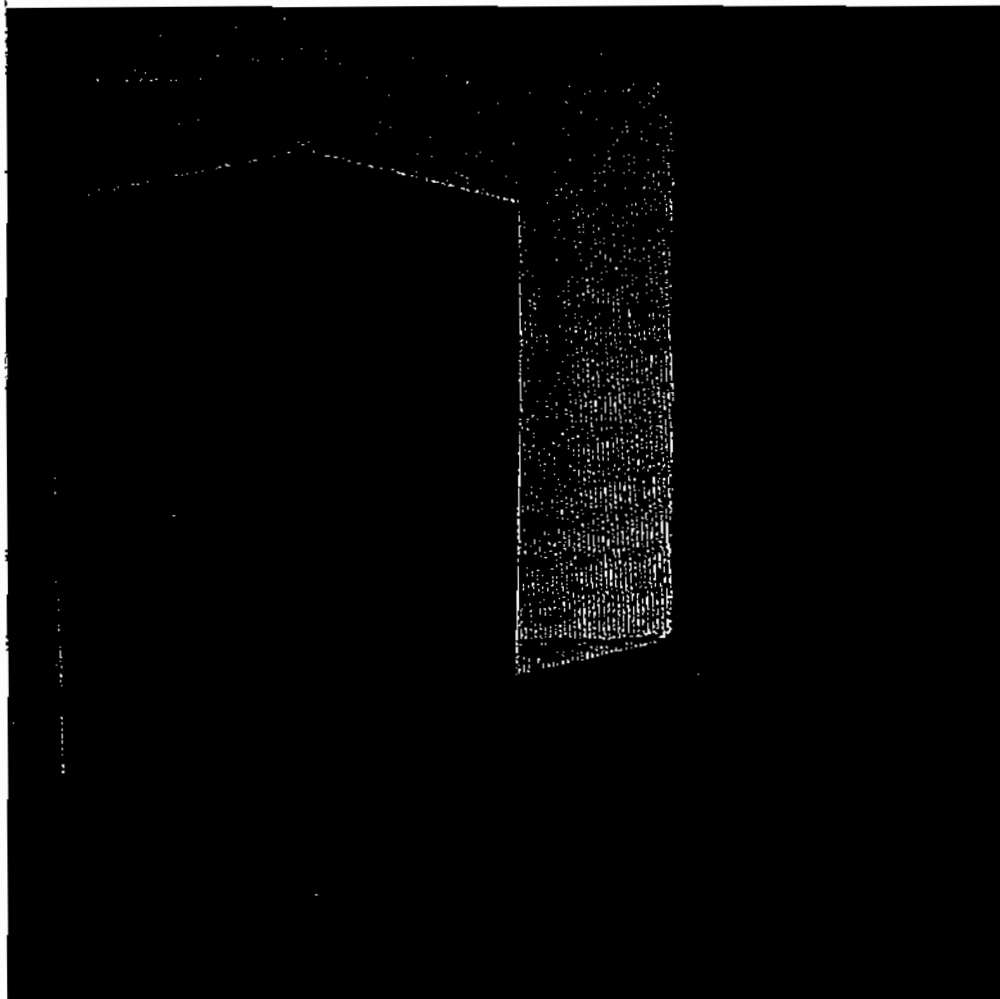
DECISION SUPPORT

Flexible reporting facilities within decision support applications typically involve a database that retains information about some domain of an organization's operation and a means for end users to access this database in an ad hoc manner. The volume of data retained in the database varies based on the level of detail required and the time period for which the data is retained. Systems retaining data

at a detailed level tend to be more flexible than those containing summarized data. The penalty for this flexibility, however, is increased volume and poorer performance.

Designers faced with constructing large databases for decision support in an IBM mainframe environment encounter a central problem: namely, products with user friendly ad hoc capabilities often have an underlying DBMS inadequate for creating and maintaining multigigabyte databases. Powerful DBMSs, on the other hand, typically offer poorer facilities for end-user access.

This situation has improved



with commercial relational DBMSs. Vendors of such products are providing increasingly powerful report writers and application development tools. However, many DP organizations and end users are reluctant to abandon their current tools and jump feet first into a new technology. For organizations familiar with Focus (or other functionally similar products such as Ramis from On-Line Software International), a Focus or Focus-like front end to an underlying relational DBMS is highly viable.

FOCUS

Focus has been available for several years and has experienced con-

siderable success in the fourth generation language marketplace. Many major corporations use Focus and many Focus-based information retrieval applications have been developed. Focus provides a comprehensive application development environment that consists of a nonprocedural language, a proprietary DBMS, and various application development tools (such as screen manager, dialogue manager, and text editor). One of Focus's most useful capabilities is that it can extract and update data stored in a wide variety of heterogeneous data management products. Besides DB2, Focus has interfaces to SQL/DS, IMS, IDMS,

Datacom/DB, Adabas, Total, and other popular mainframe DBMSs.

The proprietary DBMS that IBI provides with Focus is adequate for small applications, but less capable for handling large volume, multiuser access applications. In relational terms, a single Focus table (segment) cannot exceed a total of 256 MB, including overhead. Its database administration facilities in backup and recovery, security, and tuning, are not as powerful as those available with a full-function DBMS such as DB2.

With DB2 as the DBMS, the obvious choice might be IBM's reporting product, Query Management Facility (QMF), as a user interface. However, closer analysis of QMF shows that it lacks some of the advanced reporting facilities that Focus can provide. QMF cannot create temporary fields derived from stored fields that persist only for the duration of a query. It lacks many of the scalar functions that Focus has, such as quotas (highest 3 and lowest 5) and advanced string manipulation. Report formats are restricted to column format types and currently, QMF lacks a matching PC product under MS-DOS.

IBI offers a PC product, PC Focus, on IBM PCs and compatibles. By using a communications card (IRMA, for example) a session can be established with a version of Focus running on the mainframe. With this facility, it is possible to create queries and interchange data between mainframe and PC. Information retained on the PC can be processed further with PC Focus, which functions almost the same as the mainframe version to create, for example, graphs and charts. The data can also be exported to other PC products such as Lotus's 1-2-3.

DESIGN CONSIDERATIONS

It is beyond the scope of this article to delve into relational data-

base design; suffice it to say a database can be designed and implemented using DB2 almost independently of any Focus considerations. However, a few special considerations are required.

The management of the database schema deserves careful attention. Focus and DB2 require their own definitions of the database schema (see sidebar). This creates an obvious potential for inconsistencies, particularly during development. However, with some thought the definitions can be arranged to minimize this potential.

The database design process in a relational environment typically results in the creation of several tables containing the required attributes. Within this database, multiple relationships exist. In ad hoc reporting, it is desirable to represent these relationships in the form of predefined views. In this way, a user need not be concerned with the intricacies of joining tables to obtain the required data.

One approach that seems to work well is defining tables to DB2 using full-length names meaningful to the internal application—that is, names to be used by third generation language (3GL) update programs. DB2 views are then defined for both base tables and joins of these tables using up to 12 character names. (Focus only supports column names with up to 12 characters.) Columns used only for internal processing can be excluded from these views. Focus master file descriptions can then be defined that exactly correspond to these DB2 views. The result is a simplified management scheme with the majority of the work accomplished within DB2. All that is required is simple, one-to-one manual verification that the DB2 view definitions match the Focus master file descriptions.

Focus provides a considerable number of features that may be incorporated into its interaction with DB2. It contains the capability to insert, update, and delete rows from the underlying DB2 database. It may not be prudent to allow end users access to these capabilities, particularly when using earlier versions of DB2 that do not support referential integrity.

Focus, Say Hello to DB2

MAKING THE CONNECTION BETWEEN Focus and DB2 is relatively straightforward—many options are available to cover various connection scenarios. The following is an example for the creation of a simple interface connection. Some familiarity with Focus and DB2 syntax is assumed. Fictitious tables are used for clarity and illustration.

Initially, tables and views are created within the DB2 database using standard DB2 data definition language. For this example, a simple customer/order database is used.

CREATE TABLE DB21.CUSTOMER (
CUSTOMER_ID INTEGER NOT NULL
CUSTOMER_NAME CHAR(25) NOT NULL
CUSTOMER_ADDR VARCHAR(200) NOT NULL
)

and an equally rudimentary order relation
CREATE TABLE DB21.ORDER (
CUSTOMER_ID INTEGER NOT NULL
PRODUCT_CODE CHAR(5) NOT NULL
PRODUCT_PRICE DECIMAL(8,2) NOT NULL
PRODUCT_DESCRIP CHAR(20)
)

Join them to create a customer/order view
CREATE VIEW DB21.CUSTOMORD (
CUSTID CUSTNAME CUSTADDR PROCODE PRODESC
PROPRICE
)
AS SELECT
CUSTOMER_ID CUSTOMER_NAME CUSTOMER_ADDR
PRODUCT_CODE
PRODUCT_PRICE PRODUCT_DESCRIP
FROM DB21.CUSTOMER A, DB21.ORDER B
WHERE A.CUSTID = B.CUSTID

Note that the field names defined in the view are limited to 12 characters. Focus can use DB2 field names of greater length, but it requires additional definitions to do so. Having defined the view to DB2, let's suppose we wish to present this to the users in a Focus format from which reports may be generated. We create a master file description for Focus that maps the DB2 view structure into Focus format. In this example, mapping is made to a DB2 view, but it can just as easily be made directly to a base table definition.

FILENAME=CUSTOMORD SUFFIX=SQLDS SEENAME=CUSTOMORD
SECTYPE=SO
FIELD=CUSTID ALIAS=CUSTID 1 1
MISSING=OFF \$
FIELD=CUSTNAME ALIAS=CUSTNAME 12 12
MISSING=OFF \$
FIELD=CUSTADDR ALIAS=CUSTADDR 200 120
MISSING=OFF \$
FIELD=PROCODE ALIAS=PROCODE 5 5
MISSING=OFF \$
FIELD=PRODESC ALIAS=PRODESC 20 20
MISSING=ON \$
FIELD=PROPRICE ALIAS=PROPRICE 9 12 P3
MISSING=OFF \$

The *filename* is arbitrary, but users use this name when referencing the view. *Suffix=SQLDS* indicates to Focus that the DB2 interface is used for access. (Using *SQLDS* as a code shows that the interface was originally developed and is still available for VME/SQL/DS.) *Field* definitions describe the attributes of the DB2 columns. *Field* is the name by which users reference this column. It is arbitrary and can be different from the DB2 name. *Alias* is the actual DB2 column name. *Usage*, the next sequential parameter, describes how the column is to be displayed by Focus. Note the message entry for *proprice*—P9.2CR. This instructs Focus to display this field as a nine character field with an embedded decimal point, two decimal positions and a CR (credit) marker if the field is negative. This illustrates one of the many predefined editing options that may be used.

Actual, the next parameter, describes to Focus the DB2 datatype: 1 for integer, A for character, D for decimal and so forth. Note that variable character fields are described and displayed at their maximum length. This is somewhat inconvenient because Focus always uses the full field length.

Joining tables within a Focus/DB2 environment can be accomplished in at least three different ways. First, a DB2 view can be defined that expresses the join between two or more tables. This view is then defined to Focus, which treats it as a simple single table. This approach is the least complicated and the one I would recommend. Second, each base table can be defined to Focus and

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on a report. This can be overcome with the edit function within a query.

□ *Missing* indicates whether the column might contain a null value. Focus handles null values correctly in aggregate functions. When it is null, Focus places a character (a period is the default) in this field where it appears on a report.

Having completed a master file description for the DB2 view, the final step is to create an access file description. The access file description serves as a link between Focus and DB2.

```
SEGNAME=CUSTORDR, TABLENAME=DB2T, CUSTORDR,
WRITE=NO, $
```

□ *Table name* is the fully qualified name of the DB2 table or view that the master file description describes.

□ *Write=no* indicates that updating is not allowed to this table. Having completed the definitions, all that remains is to allocate these descriptions to Focus. The master file description is placed in a partitioned dataset allocated to ddname MASTER. The access file description is placed in a PDS allocated to ddname FOCUSQL.

For a more detailed description of Focus/DB2 interface capabilities, refer to the Focus user manual, *SQL/DS and DB2 Read/Write Interface*.

OPERATION OF THE INTERFACE

Ever since it first became available, IBI has improved the Focus/DB2 interface to remove some weaknesses. Release 3 is the current release. Its availability has resolved several performance problems inherent in earlier releases.

To illustrate the operation of the interface, let's assume that we want to create a simple report using the customer/order view. The report prints customer name and product price, sorted by product code, where the product price greater than \$50 and the customer name begins with A. This could be achieved by running the following query. Again, some familiarity with Focus and DB2 is assumed:

```
TABLE FILE CUSTORDR
PRINT CUSTNAME AS 'CUSTOMER NAME', PRODPRI AS
```

```
PRICE
BY PRODCODE AS 'CODE'
IF PRODPRI GT 50
IF CUSTNAME EQ 'A*'
END
```

The interface will prepare a dynamic SQL query of the format:

```
SELECT PRODCODE, CUSTNAME, PRODPRI FROM
DB2T, CUSTORDR
WHERE PRODPRI > 50 AND CUSTNAME LIKE 'A*'
ORDER BY PRODCODE
```

DB2 will process this query and generate an internal result table. On completion, Focus will fetch the result rows one at a time and store them in its own workspace. Focus then processes these rows and formats the report as requested and presents the result to the user.

```
CODE CUSTOMER PRICE
NAME
1234 ADAMS, J. $ 67.54
4567 APPLEBY, S. M. $ 9876.78
8901 AUSTIN, J. $ 111.50
```

The order by clause is only generated by Focus if the optimization feature is activated. IBI would highly recommend this. One of the most serious weaknesses of rel. 2 of the interface was that Focus could not request DB2 to do any sorting. Consequently, Focus always did its own sorting, whether it needed to or not. While DB2 does not contain the intelligence to know if the retrieved rows were already in the correct order.

Another problem rel. 3 addresses is aggregate functions (min, max, sum, count, avg). The interface now uses DB2 functions when appropriate. In the previous release, Focus would perform these functions on the result rows.

IBI provides several trace capabilities with the interface that enable database administrators to monitor the generated dynamic SQL. These are very useful, particularly when used in conjunction with the DB2 EXPLAIN function to determine the selection path chosen by the DB2 optimizer.

tion can be created expressing a join between DB2 base tables. Focus then creates the appropriate dynamic SQL to effect the join when a query is made using that description.

Note that joins are not restricted to DB2 tables. For instance, it is possible to join a DB2 table to a Focus or VSAM file.

USER INTERFACE NEEDS

"Make it simple" is the key phrase when designing a user interface for decision support applications. The Focus/DB2 interface utilizes TSO to operate in an MVS environment. Before Focus can be initiated, various data sets must be allocated to the TSO session. This can be accomplished either by a CLIST (a TSO command procedure) or by a logon procedure. In either case, you can arrange it so that Focus is automatically initiated when the user logs onto the system. The result from a user's point of view is that all system functionality is accomplished within Focus. Indeed, the fact that Focus is running under MVS/TSO accessing an underlying DB2 database can be totally transparent to the user.

IBI provides two means by which the Focus-to-DB2 connection can be established. Focus can be initiated using the TSO DSN command, and thus maintains a TSO thread to DB2 for the entire duration of the user's Focus session. Alternatively, the DB2 Call Attach Facility (CAF) can be utilized. IBI introduced support for CAF with release 2 of the interface. Using this facility, Focus allocates a thread in conjunction with the first native SQL command of a query request and releases it with the final fetch command. Thus, threads are created only as needed, much like QMF.

Focus provides a wide range of facilities for end users, including a statistical and financial analysis feature, a Lotus-like spreadsheet, IBI's Foccalc, and a menu-driven report writer, IBI's Tabletalk. The latter appears to be highly attractive. Instead of learning Focus's report writer syntax, this facility provides menus that prompt users with questions about their proposed query and builds

the Focus join command can be used to dynamically create joins. This is currently restricted to only one joining field in each table. Another option in the same category that does not have this restriction

is the Focus *match* processing feature. This option, while somewhat crude, can be effective in certain types of queries, particularly when an outer join is required. Lastly, a single Focus master file descrip-

Focus commands for them. However, my experience has revealed that this, while useful for novices, has limitations that soon force users to create queries using the standard Focus report writer.

Most basic functionality required by a flexible reporting system is provided with Focus. However, several additional tools might be considered for building into a Focus-based reporting system: a menu-driven online data dictionary (IBI does have an optional passive data dictionary), a facility for submitting and examining the output of long running queries (run overnight in batch mode) and a facility for user friendly query management—that is, a function to list, add, change, and delete user-written queries. Building these tools can be relatively easy using the Focus dialogue manager, the Focus text editor (TED), and TSO utilities.

RESOURCE LIMITATION

Controlling runaway queries is a concern that surfaces very early on when considering end-user, ad hoc access to large relational databases. It is vital that a mechanism be provided to shut down a query after it has consumed a predefined limit of system resources.

Focus provides a means for constraining queries, which is a readlimit that limits the number of rows retrieved. However, when accessing an underlying DB2 database, this is ineffective. The effect of the Focus readlimit is merely to constrain the number of result rows returned to the user after DB2 has completed the query.

Once Focus has generated the dynamic SQL query and passed it to DB2, Focus simply waits for DB2 to return the result. DB2 might access many million rows and create and sort an enormous result table. Only at this point will Focus start to fetch result rows and apply its limit, returning, for example, 1,000 rows to the user. One solution can be to "time out" the user's TSO session, but this is somewhat untidy. The user is logged off and any retrieved data is lost. A slightly better option appears to be the governor facility, which IBM finally provides with DB2 v. 2.

Focus can create a variety of archive subsystems

ARCHIVING

In most information systems, a point is reached at which data must be "aged" off the database. In some cases, it is sufficient to just discard this data. In other cases, it may be necessary to archive the data to some form of secondary storage where it may be accessed later. A problem with secondary storage is that the means of querying this store is typically different from that of the primary database. A solution could be to reload the archived data into the primary database. But this often proves cumbersome and slow.

One of Focus's strengths is its ability to access data stored in various forms using the same query syntax. With this facility, it is possible to create a variety of archive subsystems. Consider, for example, extracting data to be archived from a DB2 database and writing it to secondary storage (tape).

If the tape file is organized to keep the same table and row structure as the primary database (where the original file description expresses a DB2 join), you can cluster the data as different record types. Then, by creating a Focus master file description for this tape file with the same column names as DB2, a system can be created whereby users are able to submit queries in an identical format and obtain equivalent results whether they have accessed current data from the DB2 database or archived data overnight from tape.

PERFORMANCE

Compared with accessing data directly from DB2 using embedded, static SQL within a 3GL, the Focus/DB2 interface's performance is not as good. In a typical sequence of events, Focus has to interpret the Focus commands it receives, then formulate a dynamic SQL query and pass it to DB2. Focus fetches the resulting rows into temporary storage and "massages" the

output according to users' requirements. Clearly, this will not result in response times necessary for high-performance transaction processing systems. However, in a decision support environment this overhead can be acceptable.

Response times for queries can vary considerably. In my experience, a simple query against a table of 10K rows typically returned in under one minute. Queries against a one million row table, depending on complexity, often took several minutes to return. In the worst case I experienced, queries with a three-way join using 15K/2M/2M tables took two or more hours to complete!

A WORKABLE PLATFORM

This article has discussed some issues relevant to the design and implementation of an ad hoc reporting system using Focus and DB2. For decision support systems requiring access to large databases, the use of a Focus/DB2 combination can be a viable solution, particularly for organizations already familiar with Focus.

Designers faced with providing ad hoc access to a variety of heterogeneous data stores or those looking for a migration path from an older DBMS product to a relational DBMS might also want to consider this approach. Ultimately, IBM and other relational database vendors will provide decision support tools tightly coupled with their own products that will match and probably exceed the capabilities of Focus. In the meantime, the combination of Focus and DB2 remains a workable platform for the implementation of decision support applications.

For more information about IBI's Focus/DB2 interface, contact Information Builders Inc., 1250 Broadway, New York, N.Y. 10001, (212) 736-4433.

REFERENCES

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INFORMATION WEEK

THE NEWSMAGAZINE FOR INFORMATION MANAGEMENT

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ENTERPRISE COMPUTING

Database Applications



FORD PUTS GAINS IN FOCUS

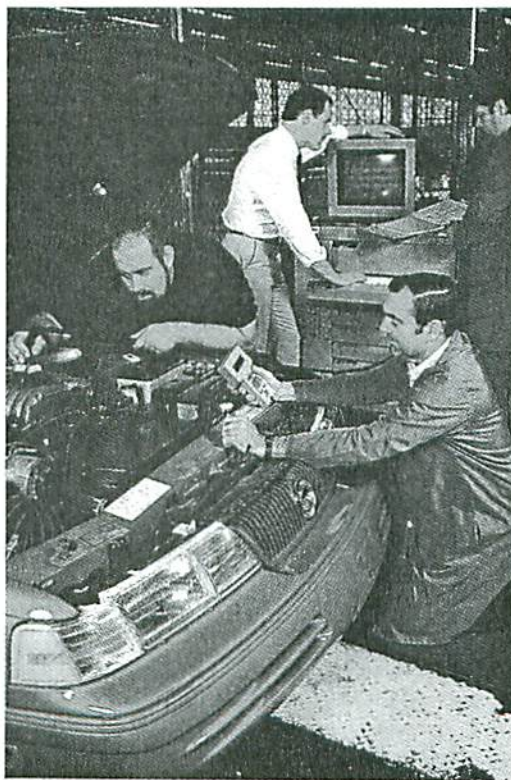
Automotive technology advances were not the only achievements honored at Ford Motor Co.'s eighth annual Customer Driven Quality Awards last week. The Dearborn, Mich., ceremonies also spotlighted technology when Ford's North American Automotive Operations honored its body engineering division for huge productivity gains achieved with a fourth-generation language and database.

Using the Focus relational database from Information Builders Inc. of New York, award recipient Chuck Hass, a section supervisor in the body engineering division, increased the group's ability to study components and systems for its various vehicles by 365% while garnering a 284% increase in the group's analysis of vehicle performance. Those percentages are based on the number of reports and studies body engineers were able to produce before and after Ford installed the 18-month-old Focus system on an IBM mainframe—a system that holds crucial information on 400 test-driven Ford vehicles.

From data gathered by thousands of Ford employees, the database provides on-line information about the wear and tear on Ford components and systems to some 300 engineers in 11 North American manufacturing plants. Hass also slices that data in var-

ious ways for the scrutiny of Ford executives and managers.

"There is no way that the fleet [of test vehicles] could serve this many engineers as efficiently without the new Focus database," Hass claims.



Body engineers use the new database as a nuts-and-bolts tool

Better Idea

Although Ford's IS staff maintains the IBM 3090 as well as the gateways

to the computer, Analytic Technologies Inc. (Anatec), a systems integrator in Bingham Farms, Mich., still maintains the Focus systems, which it built for Ford. Michael Kelly, Anatec's solutions management systems engineer, was a co-recipient of the Ford award.

With Hass, Kelly tailored the screens and menus for Ford. The automaker's users wanted "something menu-driven and easy to use," says Hass. "If it took more than 30 minutes training it wasn't good."

With those basic requests satisfied, Ford users outside Hass's division are now hankering for access to the databases. For instance, Ford's body and assembly division wants information from the database to fine-tune its new vehicle and assembly procedures. But Hass's group has further objectives of its own; it will soon incorporate a new database to help understand the effects of time and mileage on their vehicles.

Hass says the company as a whole also will look for ways to derive more detailed information from the database. In addition to linking the test drive data to other databases, he says Ford is contemplating giving its database users electronic entry via IBM's Professional Office System (Profs). And Ford's European operation plans to duplicate the system soon.

— Robert Moran

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Frank's Christmas Wish List:

Car	Country	Model	Body Type	Cost
Alfa Romeo	Italy	2000 GT Veloce	Coupe	\$26,820
Alfa Romeo	Italy	2000 Spider Veloce	Roadster	\$27,500
BMW	Germany	3.0 Si 4 Door	Sedan	\$19,320
Jaguar	England	V12XKE	Convertible	\$62,995
Jaguar	England	XJ12L	Sedan	\$59,995
Jensen	England	Interceptor III	Sedan	\$69,500
Maserati	Italy	Dora	Coupe	\$118,000
Viper	U.S.	Dodge	Coupe	\$47,050

P.S. Santa, I've been especially good this year. Any color will do...Frank



Master of the Obvious

Information Builders Brings Report Creation into Focus

Information gathering — the primary function of a computer. So much for the obvious. Information Builders lets you master the obvious with its report writing program called Focus. You control and present your database information through Focus functions that let you

enter, maintain, retrieve, manipulate and analyze data for standard or custom report generation.

Categorizing Focus as a mere report writer is a misjustice, to say the least. Focus bridges the gap between users and developers, keeping applications consistent on all levels of use.

Focus is command- and menu-driven and can be invoked interactively or in batch mode. We created reports directly from the Focus command prompt using the Focus command language. We also took advantage of the menu-driven TableTalk tool. The reports we created ranged from simple lists to complex documents containing headings, subheads, totals and subtotals, and graphs such as connected point plots, histograms, charts and scatter diagrams.

DP Labs discovered that the Focus command language was easy to learn. However, if the syntax isn't convenient enough for you, Focus provides TableTalk, a tool for requesting and formatting reports. The TableTalk command calls a series of pop-up windows starting with a list of your files. You then select from progressive windows that contain stock operations such as print, sort, sum and computations like percentages and ratios. We used the pop-up menus to sort our data alphabetically, numerically by rows and columns. We specified criteria using boolean parameters and included custom headers and footers.

Once we created requests for reports, we stored them in files called focexecs. These then are executed as simple reports or complex applications from the command line or through a menu selection.

For example, we used TableTalk to create this simple focexec program to generate a report concerning MIDRANGE Systems Senior Editor Frank Irving's 1992 Christmas list.

focexec(incidentals)

*** TOP OF FILE ***

```
TABLE FILE GIFTIDEA
PRINT COUNTRY AND CAR AND MODEL
AND BODYTYPE
BY COUNTRY
HEADING CENTER
"FRANK'S CHRISTMAS LIST"
" "
ON TABLE SET PRINT OFFLINE
END
```

Once you configure how your report request looks, you execute the request for on-line viewing, save it, or send it to a printer. You also request that the data be retrieved and saved to a file outside TableTalk or merely temporarily held in a holding file. Finally, you can clear the request or quit TableTalk.

Focus uses a non-procedural language in addition to TableTalk. Traditional, procedural languages require that you specify step by step how the system processes data, using open, sort, read and close commands, for example. DP Labs found that Focus' English-based syntax allowed us to create reports more rapidly than traditional languages. So rather than handholding the system through a series of commands, we just requested a report be printed using the print command and a Master File Description to describe the type of

Focus

Features:

- Split screen editing
- Command line- or menu screen-driven
- Easy to learn syntax
- Used for application development and as an end user tool
- Graphics tool

Platform: AS/400

Price: One-time license \$6,000 to \$147,000, monthly license \$571 to \$5,271

Information Builders

1250 Broadway
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(800) 969-INFO

Product Line: 4GL application development and maintenance software

BY CHARLIE SIMPSON

MIDRANGE
Systems

The Independent Newspaper for IBM Computing
JANUARY 26, 1993 VOL. 6, NO. 2

data file we needed, which indicated where the file was located. Once we mastered the lingo, we generated simple standard reports as quickly as we did through the menus of TableTalk.

Don't confuse how to process data with how to present data in Focus. Although you don't describe every detail of the process to Focus, the flexible functions of Focus let you specify how your reports will look and what information they contain, from custom column headings to complex applications, such as sorting, calculations, subtotals and graphs.

All Focus reports start with the Table command request. The Table command starts the request process, letting select a file and specific information from that file. A Dialogue Manager helped us further develop and execute the focexecs. Dialogue statements let us move within a focexec, branch to another focexec or combine multiple focexecs to perform complicated operations.

We couldn't decide which was more fun: TableTalk's pop-up menus or Focus syntax. Although aimed more at the non-programmer, the menus make program customization quick and painless.

We used TED, the Focus full-screen text editor to modify Frank's request list to include a little message to Santa at the end of his report. The figure was what we came up with as our report using TableTalk and TED. TED allowed us to

quickly access and edit files such as Master File descriptions, report requests, focexec and AS/400 native data structures, while we were in Focus. TED's environments include type, edit and input. Simply by positioning the cursor, we added, deleted and replaced text anywhere on the screen.

DP Labs found TED easy to use, performing as most text editors with a few extra abilities such as a split screen cut and paste feature. TED defaults to the type function which let us enter standard editing commands on a line by line basis. Edit, similar to type, allowed us to use prefix commands such as DEL for delete, MO for move, or REC for recover to edit blocks of text. Input is a function found in both the edit and type functions that permitted us to add an unspecified number of lines to a program. A split screen function makes moving file text within Focus a breeze. Although Focus supports other editors, we prefer using TED due to its ease of use and performance synchronization within Focus.

To design full-screen forms that allow data entry and application development, we used the Focus Interactive Data Entry Language (FIDEL). We took advantage of FIDEL in conjunction with the Dialogue Manager to create on-line forms that contained fields in which variable data could be entered.

We handled more complicated reports such as calculating balance sheets and

consolidations with the Focus Extended Matrix Reporting (EMR) feature. EMR, an extension of the Table command helped us generate common what-if scenarios. EMR is a great tool for application developers who need to create decision support systems that include statistical analyses and graphics, along with financial statements.

Although the graphs created in Focus were basic, they successfully conveyed their message. The Focus graphs provided a fast visual complement to the tabular information presented in our reports. Creating graphs is easy in Focus. The Graph syntax is practically identical to the Table request syntax. We were able to convert Table requests directly into graphs by adding only one extra line of text. Like Table requests, we customized the graphs to contain headers and footers.

Like the TableTalk requests, the graph function comes with its own menu-driven tool called PlotTalk. PlotTalk eases the task of creating graphs by providing menu selected graphs including continuous curves, vertical and horizontal bar charts, and scatter value diagrams.

Additional pop-up windows let us plot on the vertical and horizontal axes, according to percentages, averages, counts, maximums and minimums of various data fields.

Several user aids and utilities helped us navigate through Focus. An on-line help system provides in-depth informa-

tion about numerous Focus topics. A Set command let us configure our Focus environment, such as output and work areas. A Let command allowed us to substitute words and phrases for other words, while the join command let us report from two or more related databases with one request.

In the end, what impressed DP Labs the most was that Focus is easy to learn and to use. By the end of the first day we were generating custom reports like pros. The documentation is one of the better books we've read in a while, and comes with a Report Writing Primer that quickly gets you into the program.

The two ideas that repeatedly struck us while using Focus were simple and complex. Although conflicting terms, these two words best describe the performance of the program. Easy to use syntax and menus produce in-depth and thorough documents.

There is something for everyone in Focus, even for our editor Frank. Unfortunately, there was no sports car in his driveway Christmas morning. Apparently things are tough even at the North Pole. Despite his professionally prepared wish list, it looks like Frank will be driving the '70 Swinger for yet another year. ■

 **FOCUS**

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Focus on Shared Images

Information Builders enhances data management with Shared Image Applications feature in Focus for OpenVMS V6.5.

Information Builders has introduced version 6.5 of its Focus for OpenVMS 4GL. The company promotes Focus for OpenVMS as a complete and integrated toolset for information management. The new version is designed to enhance the product's ability to meet a range of information needs through a single integrated environment.

Among the most significant new capabilities is the Shared Image Applications feature. It raises the performance of Focus data management applications to levels approaching that of 3GLs, according to the company.

The Shared Image Applications feature enhances data management application performance by allowing you to compile applications into object files. The object files are linked into shareable images using standard OpenVMS services. These images can be installed, thus providing Focus users with the same benefits and performance they enjoy when using 3GL-based shared images.

The Shared Image Applications feature can reduce overall memory use by allowing users working with the same application to

"share" portions of the application.

As Melissa Webster, Information Builders' vice president, Digital Division, explains, "With Shared Image Applications, we have rearchitected our product so that users can take existing production-level data management applications, running against any number of local or remote databases, and turn them into shareable, re-entrant applications."

Also new in version 6.5 is a StyleSheet facility that lets you create customized, operational reports. StyleSheet lets you solve MIS reporting problems with the productivity and ease of use of a 4GL, according to the company. It provides access to all PostScript features and functionality, including

multiple fonts, font sizes and styles, portrait and landscape page orientation, and control over column placement, margins and paper size.

StyleSheet also lets you address MIS reporting challenges that previously could only be solved using COBOL or other 3GLs. For example, with StyleSheet, you can use a 4GL to complete complex business forms that require data to be in exact positions and in various font sizes. Further, reports that contain so much information that they would normally require two pages can be presented on one page by controlling font sizes, printing in landscape mode, or automatically resizing a column to its minimum width based on

FOR MORE INFORMATION

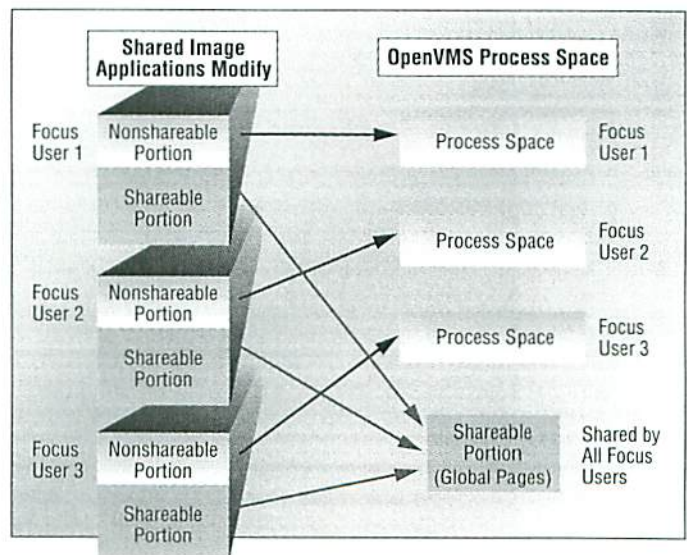
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the actual data retrieved from the request.

New features also include MATCH_WHERE, which lets you minimize locking and database I/O when accessing Rdb databases, and NOSPLIT, which ensures that sets of logically grouped report output lines are kept on one page. Other new features provide functionality for DSM and ALL-IN-1 users.

Focus for OpenVMS V6.5 costs from \$3,200 to \$194,000.

Shared Image Applications: In this example, most portions of the application are shareable and used commonly by each user. Nonshareable sections remain private.



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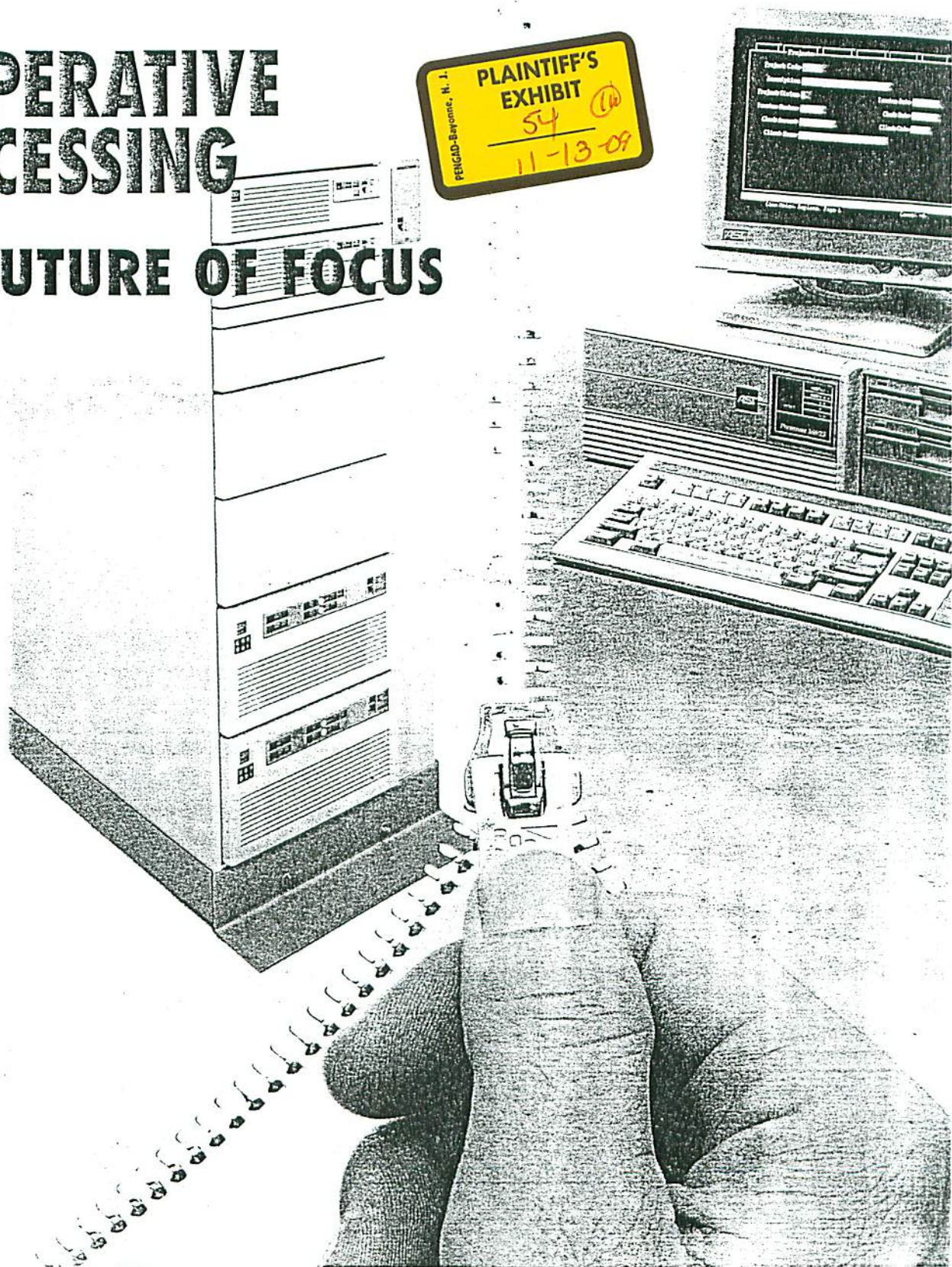
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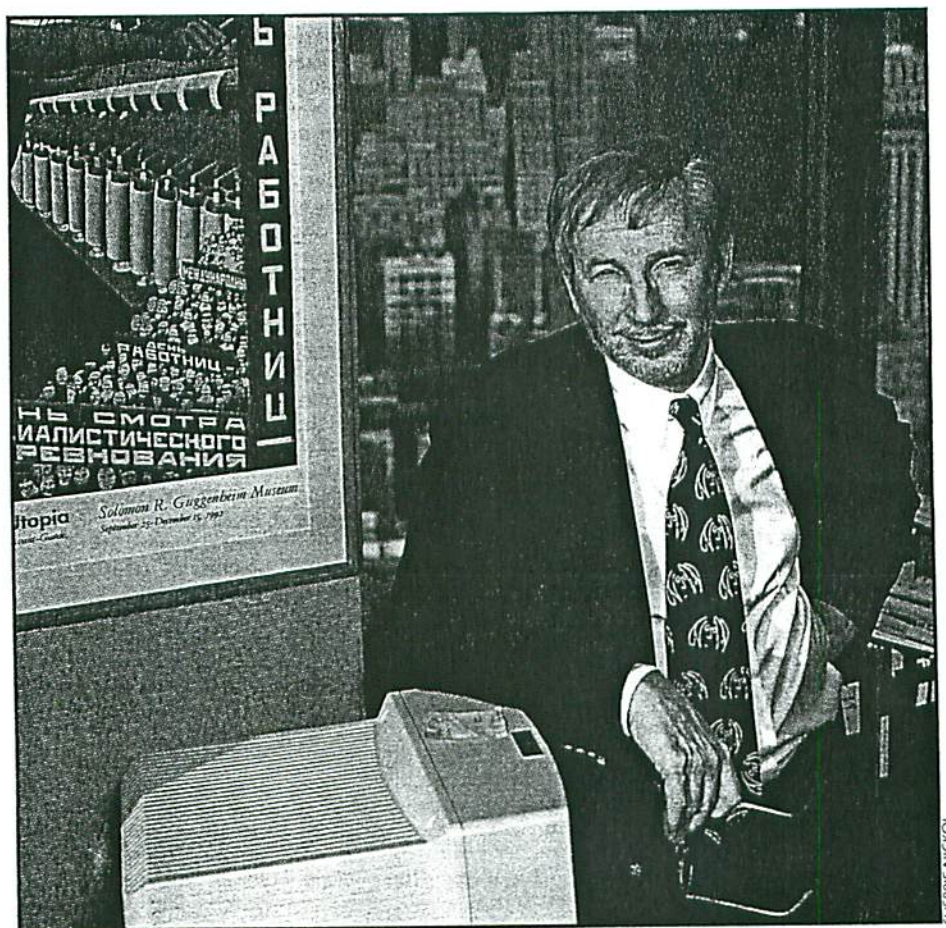
THE FUTURE OF FOCUS



MARCH 22, 1993

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VOL. IX, NO. 12



Information Builders Inc. President Gerald D. Cohen, a Manhattan native, is proud of his New York roots and says it's the labor force that has kept his company here.

A software giant starring on B'way

BY ROBERT McNATT
CRAIN'S NEW YORK BUSINESS

Forget flamboyance. In an industry full of high-profile entrepreneurs, Gerald D. Cohen, president and co-founder of New York City's largest computer software company, stands out by blending in.

He doesn't race boats across the Pacific, like Philippe Kahn, president of Borland International Inc., or build environmentally correct mountainside homes like Microsoft Corp.'s Bill Gates.

Instead, the head of this privately held

\$225 million company pedals his Bianchi bicycle around his Upper West Side neighborhood. He won't reveal much, not even his age, saying, "I'm 50-plus."

But despite his public reticence, Mr. Cohen has built Information Builders Inc. into one of the nation's top 20 software companies. Its computer language, called 4GL, and flagship product line, called Focus, are leaders in the highly competitive market for data base management software.

IBI expects to gross \$250 million in 1993, up some 11%. While it doesn't





Making a Difference for the Business

The State of Oklahoma Department of Human Services (OKDHS) delivered an application that might sound too good to be true—but isn't. It's a difference-maker for the business that achieved green initiative goals, lowered Total Cost of Ownership (TCO), eased management of system assets and their retirement cycles, and was delivered seamlessly and transparently to users.

Serving more than 100,000 children per year, the OKDHS was looking for more effective ways to orient field staff to results-driven performance. A major part of the effort was giving field and central office staff ready access to the department's data repository for child welfare (known as the KIDS system) with new and highly agile reporting tools.

Four years ago, it took OKDHS users in field offices and headquarters up to three weeks to produce a usable report. Today, these same users can define and produce reports in 24 hours of programming time, obtaining results that are both standard number- and data-oriented reports and pictorial representations of the data, such as pie and bar charts. The new reports let staff quickly see how they're doing with their child caseloads—and target any critical areas needing immediate response.

Agile reporting was achieved by moving staff from traditional FOCUS (from Information Builders) on an HP UNIX platform to its WebFOCUS product residing on virtualized Linux on System z. This virtualized migration from HP-UX to Linux on System z occurred transparently to OKDHS staff. OKDHS IT coordinated renovation of the reporting function with retirement of aging UNIX assets, simultaneously gaining advantage from new system flexibility and capabilities on System z that simplified asset and workflow management.

The Need for Consolidation

The original migration and consolidation goal for OKDHS was to move the child welfare system from HP-UX to Linux on System z.



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Mainframe Software and Support

BY MARY E.
SHACKLETT

"We run 15 different systems on the System z," says Chris Little, OKDHS z/VM administrator. "One of the goals we had for this HP-UNIX to Linux on System z migration was to also migrate from legacy FOCUS on HP-UX to a newer reporting tool on Linux on System z that would make report requests and production easier for our end business users."

There were several phases—and objectives—in the HP server consolidation project to System z.

"First, DHS had mission-critical systems that it wanted to better position for end business users so they could go about the work of serving the residents of the State of Oklahoma," says Little. "This involved finding a more user-friendly reporting tool that happened to run in the Linux on System z environment and that our users could learn as they achieved immediate results. At the same time, OKDHS was reaching the end of its technology lifecycle for many of its servers, including the HP-UX machines."

OKDHS IT elected to take a slow but sure route to the transformation of its IT architecture. >

Consolidating Servers

Key stakeholders in the OKDHS environment
Include left to right: Sarjoo Shah, Sunni Majors,
Jim Berry, Aleta Seaman and Bill Hindman



Facing Early Fears

The first task was discussing the new server consolidation direction with users to obtain their buy-in and support.

"Those of us on the business side had to be convinced that virtualization was going to benefit us," says Bill Hindman, Programs Division IS administrator for the OKDHS Children and Family Services Division. "Previously, end business users had their own dedicated boxes for processing information and reports. Suddenly, we were being told these servers were being eliminated and that our applications were being moved to the mainframe. We also heard we would now be 'sharing' computer resources with other parts of the agency."

The announcement of the consolidation strategy was initially met with understandable trepidation from users. "We wanted to be sure our needs would continue to be met with the new mainframe strategy, and that the resources would be there," says Hindman.

OKDHS IT also had its share of challenges and fears.

IT wanted to replace an older reporting system and database residing on HP-UX with new reporting tools and data that resided in the Linux on System z environment.

"When we made the decision to port the KIDS system to the System z, we developed an architectural approach that took advantage of placing Web-facing report design tools on Windows servers and migrating all of the actual report processing to Linux on System z," says Little. "We knew this new solution would produce greater turnaround on reporting for the division's end users, and provide greater and less complicated access to data repositories that already were on the mainframe."

As an early entrant into server consolidation, however, OKDHS IT had no way of absolutely knowing whether a complete toolset for the planned migration existed at every level of IT infrastructure.

"Not everything was in place for z/VM and Linux when we began our project three or four years ago," says Little. "We worked closely with IBM since we knew that a number of elements of the environment weren't yet fully mature. This was one reason why the migration project took as long as it did. ... We carefully proceeded, beginning with a migration of smaller databases to the System z that weren't mission-critical. A total of 10 people were assigned to this project, but none of them was a dedicated resource, as we were all splitting time between working on the migration and working on projects in our actual production environment."

The migration project team held weekly conference meetings. They opted to use Tivoli Storage Manager as an integral part of their data backup solution, but they also recognized they were "leading edge," since there were no other clients available to exchange ideas with when they first started the migration with this backup strategy.

"We encountered several obstacles," says Little, "One of these involved the backup environment. We were using the RMAN interface for backup and recovery of our Oracle database and eventually we used Tivoli Storage Manager. Unfortunately, we found that some

infrastructure tools were missing. Our distribution of SUSE Linux had supportive tools in place but we had a version of GCC [GNU Compiler Collection] that had to be built from scratch for Oracle."

OKDHS IT actually found they needed two compilers. One was GCC, which linked the Oracle libraries and ran on SUSE Linux Enterprise Server (SLES). The other was a Micro Focus COBOL compiler required to support KIDS system interfaces in the Linux on System z environment.

It was GCC, which, at the time, did not ship with a service pack that fully supported the System z environment.

IT waited for the puzzle to fall into place, piece by piece, working methodically. The SUSE GNU compiler issue was resolved once the correct service pack arrived. This secured Oracle's guarantee of support for the new environment on System z. Looking for every way to safely expedite the process, OKDHS IT was still able to "work ahead" by jump-starting problem resolution with a download of a copy of the GNU compiler so IT could build in the IBM patches that were needed for System z. Downloading and patching allowed IT to cautiously move forward, even as it was waiting for the correct service pack to arrive.

"We also encountered a major challenge with the data recovery and backup process," says Little. "This process included parts of Oracle and Tivoli, and although the hurdles we faced were purely technical, they took a long time to overcome."

Little and other DHS IT managers acknowledge that backup for the new virtual environment became a highly detailed process that involved the creation and documentation of multiple procedures and checkpoints.

"To facilitate backups, we took snapshots of every log-out because, at first, we were getting a lot of corruption," says Little. "We used flash copying with the IBM stack and took snapshots of the DASD. We still do this. The Tivoli Storage Manager hooks into the Oracle RMAN [Recovery Manager] utility to complete the backup mechanism."

Little says that recovery and database backup became major challenges because there just wasn't a good unified online solution at the time that would support RMAN, which is Oracle's primary data backup utility.

As they overcame technical hurdles that were symptomatic of being an early adopter of a server consolidation strategy, OKDHS IT staffers also had to face their fears of the unknown. The level of fear varied, depending on the person with whom you talked.

"Some of the IT staff was very apprehensive," says Aleta Seaman, database manager. "All of this was bleeding-edge technology when we started our consolidation. Still, both on the operating system and the hardware sides, people were excited about the possibilities."

Little agrees. "A big part of the project was achieving a comfort level," he says. "At the time we started our migration, Linux was still a dirty word in much of the IT industry. Linux was considered a 'hobby' or a 'toy' system then. We knew that the end result was to bring mission-critical applications to a new platform—and along the way, we had to feel comfortable by first performing the database

migrations with databases that weren't considered mission-critical. In this way, if an outage occurred and we had to move back to our original platform, we could do so without impacting a lot of people."

OKDHS IT ran through its migration strategies many times to reassure IT staff and users. When appropriate, IT repeatedly ran its test suites, taking every precaution to ensure the right results came back from the tests. As a support "backbone," both Oracle and IBM committed resources for the project.

"We were pleasantly surprised at how easy it was to move from the HP-UX platform to Linux on System z," says Little. "We had anticipated this might involve significant retraining for staff, but it didn't. One side benefit we hadn't even hoped for was that so many of the scripts previously written for the HP-UNIX platform still ran without much modification on Linux on System z."

Reaping Extra Benefits

When OKDHS IT started its server consolidation project four years ago, the department was still running a System z900 class machine. Today, OKDHS runs a System z9. From the purely IT side, OKDHS has seen benefits beyond the delivery of more facile applications to users.

"We were so close to the end of our lifecycle on HP-UX, and the hardware was getting very expensive to support," says Sunni Majors, director of Enterprise Technical Services. "By moving Oracle to the Linux System z platform, we were able to restructure costs for CPUs and move away from licensing by user. This gave us a better return on our investment, since we experienced significant savings in our hardware and software licensing costs by consolidating resources onto a single platform."

OKDHS IT also was pleasantly surprised at the ease of the server and application migration to Linux on System z, although it remains vigilant when it comes to asset management and TCO throughout its IT architecture.

"There is more to assessing the cost of doing a server consolidation and application migration than simply eliminating servers and licenses," says Little. "You also have to assess where you will have to add incremental CPU memory to the System z, which is comparatively expensive when compared to similar costs in the Linux/Intel environment. This is why we place a priority today on being extremely efficient with our System z resource utilization. The bottom line is [that] you have to make sure the way you scale your resources matches your ability to invest."

Checking in With the Business

The OKDHS KIDS system is the bedrock of its child welfare program and is instrumental to that program's administration.

"We receive 65,000 reports of child neglect and abuse each year, and track more than 100,000 children," says Hindman. "When you extend this information to families, the amount of data is exponential."

Hindman acknowledges that the end-to-end migration effort initiated by OKDHS IT was entirely transparent and

seamless to users, who also have seen improvements in the level of computing service and in what they can do with their program reporting.

"We're in the process now of planning a new enterprise application where our child welfare and family support systems will all be in one application on a single mainframe platform instead of siloed on different platforms," says Hindman. OKDHS IT also is planning to move its data warehouse, now on 39 separate Windows servers, to the System z.

"We're continuing to add functionality to our Linux on System z environment," Little adds. "We're now playing a little 'catch up' to handle all the changes in applications that we have undergone. The changes we're adding are beginning to stress the load on the system to where we're considering a possible CPU investment."

OKDHS IT also has a proven methodology for reliability and backup, which was an early migration concern.

"On the HP-UX side, we just did the database backups via a SCSI [Small Computer System Interface] tape drive that was attached to the server," says Little. "But on the System z, Tivoli Storage Manager was, and is, our primary enterprise-side backup solution."

Conclusion

New agile reporting is making a difference in OKDHS' ability to track results and outcomes, and they plan to continue to grow this reporting environment and the data warehouse access that accompanies it. Over the next few years, the department plans to add Key Performance Indicators (KPIs) as it continues to grow its data warehouse in the Oracle/Linux on System z environment.

"Linux on System z provides OKDHS with a flexible and scalable environment that's also cost-effective," says Sarjoo Shah, Data Services director. "OKDHS intends to leverage the Linux on System z environment to provide faster and agile solutions for its division through the use of OLAP [Online Analytical Processing]-based tools and the Web enablement of applications."

Users also are pleased with future projects and directions.

"I spent time as an implementation manager with OKDHS in 1994, so I wasn't just going to say 'yes' to mainframe virtualization," says Hindman. "But I also have been with the agency for 30 years, and I had to look at the project from the standpoint of what was best for DHS. ... I can say that moving to the mainframe was the right thing for us to do. We have the resources and the skillsets there, and the application consolidation has simplified our operations. The process of migrating off other platforms and onto the mainframe was totally seamless, and didn't negatively impact end users. I would have to say we are very satisfied on the business side." ■

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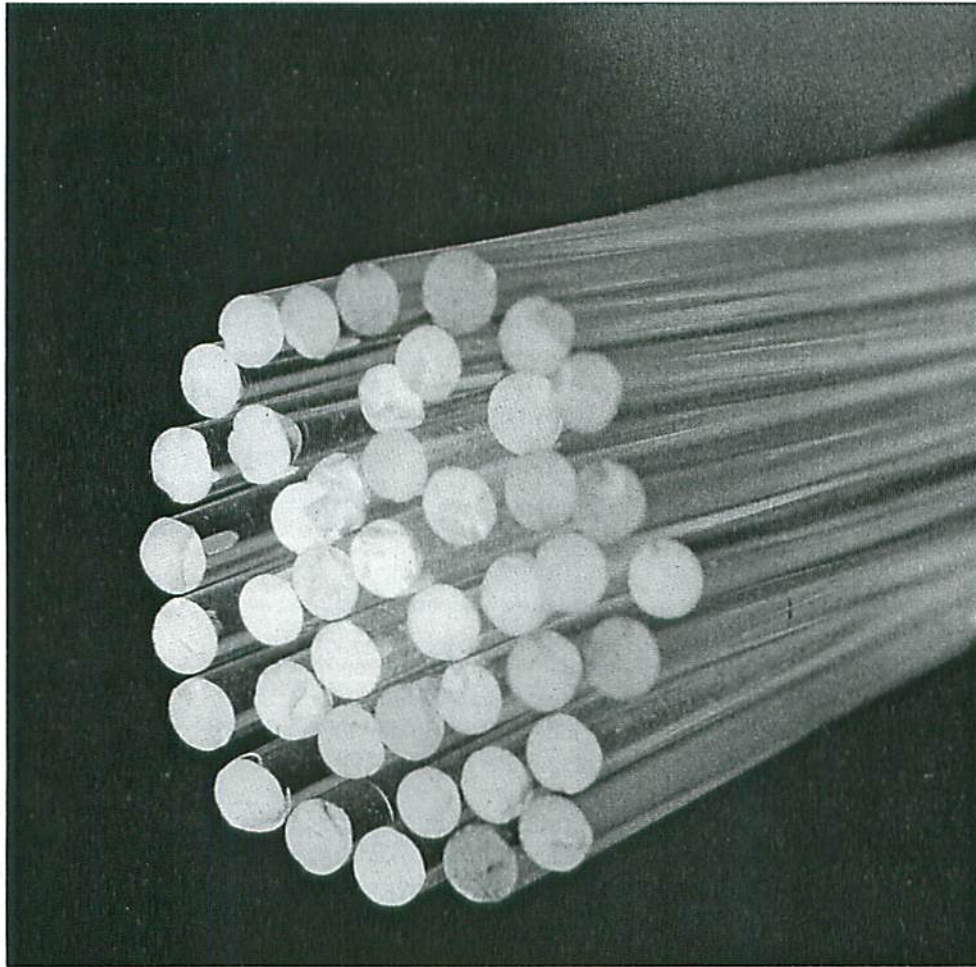
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FOCUS in Action

US Sprint



"Glass house" data on the desktop.

Glass House Data on the Desktop: Sprint International Distributes Ad Hoc Reporting

When Sprint International, US Sprint's global communications group, decided to implement a front-end decision support system environment, the company quickly realized that traditional application development methodologies could not deliver the needed information directly to end users in the required time frame. In response, the company's Information Management (IM) department embarked on a distributed development strategy to deliver traditional "glass house" mainframe data to users' desktops.

Based in Reston, Virginia, Sprint International has developed and installed private dedicated data communications networks and electronic messaging systems for corporations, governments, and other organizations in more than 50 countries. Sprint International was formed from the domestic and international data communications systems, international data communications services, and global messaging businesses of Telenet Communications Corporation and the international voice, video, and virtual private line services business of its parent, US Sprint Communications Company.

US Sprint also provides long distance voice, video, and private line services in the United States and owns and operates SprintNet data services. US Sprint is a part of United Telecommunications, an \$11-billion telecommunications company headquartered in Kansas City, Missouri.

The company's IM department became convinced that the best solution was to give end users the tools to create their own ad hoc reports and the means to extract and manipulate the information they clamored for.

At first glance, the computer operation appears to be mainframe-centered. It operates an IBM 3090 running MVS/XA. While the company uses Prime and Tandem minicomputers, data flow is regulated through the mainframe. Its database management systems include IBM's IMS and DB2, and Computer Associates' IDMS.

On the other hand, the time is right for decentralizing and distributing ad hoc reporting efforts to user desktops. The company has a critical mass in workstations. The PC-to-employee ratio is close to 1:1. IBM PCs and Apple Macintoshes are costandard. The networking infrastructure is well established. Most users and departments are connected through the company's SprintMail electronic messaging service, as well as via Local Area Networks using Token Ring, Ethernet, and Novell technology.

The IM Services group defined an environment that would support the mission to develop the capability needed to make users more self-sufficient.

User Needs First

From the beginning, the group took a "user needs first, technology second" attitude. It had a frank bias for PCs and, whenever possible, its solutions relied on desktop power. But at the same time, it retained control of the environment. It put a high priority on the need for data standards, and committed itself to complying with company

standards for naming conventions, data architecture, and structured methodologies. "While we let the user's needs drive the requirements, we were also very conscious of the need for a standardized architecture to facilitate the interconnectivity of applications and data," says Suresh V.

Mathews, Director of Information Management Services.

It became clear that the organization and the end users needed a new toolset to manage the database and develop new reporting applications. After a thorough review, Sprint International installed Information Builders' FOCUS, a Fourth Generation Language and Database Management System. The company needed a system that was available to both mainframe and PC platforms. It needed to be able to pull data seamlessly from sources as diverse as IMS, IDMS, and DB2 into a central repository, and then to distribute information to a growing end user community. FOCUS served these requirements well.

Mainframe FOCUS is used to create a large central data repository or file server. The data, collected from various business sources, is then organized on the mainframe into Business Views or departmental



profiles. Diverse perspectives on business units, financial summaries, human resources information, and operational details can then be easily extracted by end users.

The most important feature of these new applications is the user interface. A Graphical User Interface was developed, based on mouse-controlled windows, icons, menus, pointers, and scroll bars. The umbrella name for this system is Information ACCESS, an application that gives end users standard menus for extracting and manipulating centralized data. ACCESS presents users with menus from which they can call for increasingly specific views on a variety of topics. Users also employ ACCESS to create personal databases that are mirror images of the corporate data model.

"ACCESS gives us distributed functionality in its truest sense: centralized control over the distribution of data," says Abbas Sharifi, Manager of Corporate Data Access. "We use the power of FOCUS to create a central repository on the mainframe, and then distribute the access and reporting capability to the individual users who can access the repository and extract a subset of data pertinent to their needs," he adds.

International Business Views

The first ACCESS application that was rolled out gave users a set of international-specific Business Views. Using the reporting system, users can quickly get consolidated views of costs, revenues, P&Ls, and other pertinent details. International marketing analysts use ACCESS to pull together profiles of their worldwide customers and projects quickly. In the past, compiling such information took one to two weeks. With ACCESS, the same information can be assembled in less than an hour, Sharifi reports. Besides the obvious

time savings, the bottom line is that marketing analysts can do a better job of analyzing and acting on the reports and their implications.

The advantages to users extend far beyond extra productivity, and ACCESS substantially enhances the quality of decisions. "The business profiles users are now generating for themselves were simply not available before," Sharifi says. Moreover, ACCESS incorporates features that let the user do a lot of work in background mode. For example, the system can be programmed to run a mainframe job that updates a user's PC automatically. In the morning, when the user first comes in, their PC is ready with up-to-the-minute data. From there, the user can extract specific views of the data and then send a report via the SprintMail electronic messaging service to any US Sprint worker in the world.

Sprint International users at all levels are beginning to feel the impact of ACCESS. Several executives have accepted the system, representing the first real use of automation at that level. The system allows executives to review worldwide operations on demand and to create Business Views on the items of choice. While the system may have similarities to an executive information system, Mathews is quick to distinguish ACCESS from such office automation systems. "We are marrying back office technology (with basic mainframe databases) and, through workstation tools, disseminating information to decision makers in ways not possible before." The system does more than colorfully display predigested information. ACCESS supports business professionals who need to transform raw data from various sources into useful business information.

Information Management (IM) is still not quite ready to allow end users to update the corporate

database, however. While it is technically possible to let end users upload information to the mainframe databases through FOCUS, IM has not worked out the management specifics of such database administration headaches as data concurrency. As these details are worked out, limited updates could be possible.

For the time being, if users need to update a database, they will have to go through the source application. For example, if the finance community wanted to change budget forecasting data, they would have to go into the service application and make the changes there. Information Management would then use a production utility to extract the data and populate the reporting database.

System Payoffs

"Finding the payoffs for the new distributed reporting system is not hard," Mathews says. When measured against the old, reactive way of doing business, the system puts Sprint International business people in a better position to be proactive, offering customers services even before they ask for them. "If we can equip our sales, management, and support people with information that is directly beneficial to our customers, everyone benefits. The information provided via ACCESS allows our people to respond faster, improve service, and offer new products," he adds.

As long as strategic planning represents a competitive edge for organizations, the investment Sprint International has made in ACCESS and the accompanying information infrastructure will remain a critical success factor in the company's quest to remain first in its field. "We are at the heart of it," agrees Mathews. "We are taking previously inaccessible glass house data and putting it on the desktop where it has the most value."

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Customer Profile



Electric Utility Contains Thunderstorm Damage With FOCUS

Bristling with lightning bolts and dropping a deluge of rain, an enormous thunderstorm rumbles across the hills of Missouri toward St. Louis. The storm spreads havoc everywhere. Lightning strikes. Tree limbs fall. Power lines go down. The lights in people's homes flicker and go out. Hospitals switch to emergency generators.

At the Storm Control Center of AmerenUE (formerly Union Electric), a flood of calls jams the lines as an enormous thunderstorm rampages across the land. Dispatchers scramble to direct work crews to affected areas, while Storm Control Center personnel act quickly to obtain a complete picture of the damage. How many power lines are

Snapshot

Organization: AmerenUE, formerly known as Union Electric.

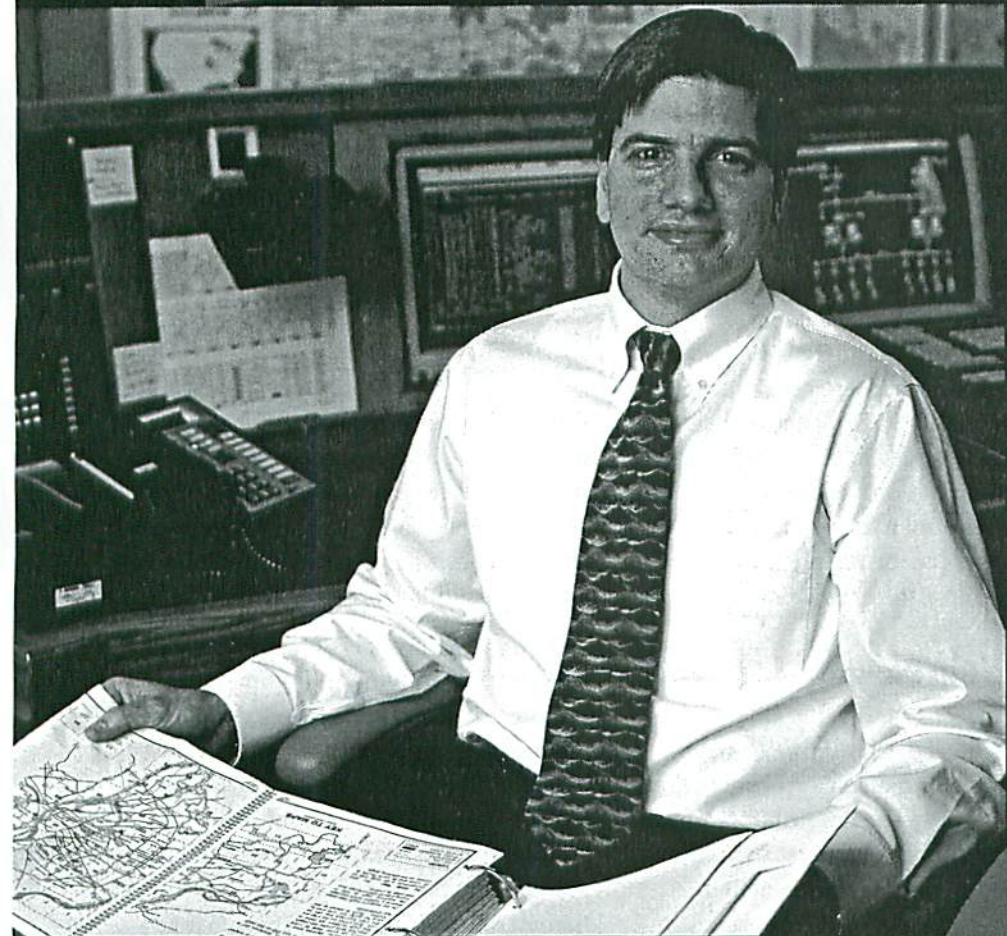
Profile: One of the nation's largest utilities, serving 1.3 million electric and gas customers over 24,500 square miles in Missouri and Illinois.

Headquarters: St. Louis, Missouri.

The Challenge: Establish an effective storm-restoration analysis system.

Results: Implementation of a user-devised, highly effective storm-analysis system for rapid storm-restoration processes.

Information Builders Tools: Mainframe FOCUS, FOCUS Six.



"FOCUS tells us things like how many customers we have restored in the last hour, which customers have been out the longest, how many wires remain down, what area is hit hardest, and so on. We can summarize a vast amount of data with FOCUS, to arrive at a more comprehensive view of the restoration process."

down? How many crews are dispatched and where? How many customers remain without power? And, perhaps most important, how can the company best marshal its forces to resolve the problems?

Questions like these are answered by a real-time FOCUS-based analysis and reporting system, which shifts into high gear when thunderstorms roll in. Storm Control Center experts rely on FOCUS to provide them with the high-level summary analysis they need to optimize restoration of storm-caused outages.

"Without FOCUS, it would be difficult to manage our resources," says Charlie Schaeffer, a Supervising Engineer in Ameren Corporation's Customer Services Division. "We don't run FOCUS as an after-the-fact reporting tool. It's integral to our real-time operations. We use it principally as an on-the-spot analysis tool to give our storm-management people the big picture of all that's going on in a storm situation."

Seeing the Big Picture

When Union Electric and CIPSCO Incorporated merged, they formed a new holding company: Ameren Corporation, which is parent of two major utilities – UE and CIPS, now known as AmerenUE and AmerenCIPS. St. Louis-based AmerenUE is one of the nation's largest electric and natural gas utilities, with \$2.3 billion in operating revenues in 1997, and serving 1.3 million customers across 24,500 square miles in Missouri and Illinois.

When a storm hits, the rush of incoming calls is entered into the company's DB2-based Outage Analysis System (OAS). OAS then generates a list of trouble orders based on the calls. Dispatchers review this list and contact work crews to resolve problems.



The OAS system has sophisticated analysis capabilities. For instance, it analyzes and combines calls to pinpoint locations and deduce the problem device or line section. Problems grouped in a small area, for example, might originate from a downed power line. Calls coming in from a wider area could mean an entire circuit (or

"feeder") is out of commission.

"OAS knows our entire electrical connectivity model, from customer, to transformer, to fuse, to switch, to feeder and substation," explains Schaeffer.

"The system analyzes the call patterns based

on where the customers are located on the circuit, then comes up with a best guess at where the problems lie."

What OAS does not do, however, is give storm-management personnel an ongoing status of the overall restoration process. That's a job for FOCUS, which handles the enormous volume of data coming into OAS during a thunderstorm.

"We run FOCUS analysis reports against OAS data, hour-by-hour, minute-by-minute, to assess how the restoration is progressing," Schaeffer says. "FOCUS tells us things like how many customers we have restored in the last hour, which customers have been out the longest, how many wires remain down, what area is hit hardest, and so on. We can summarize a vast amount of data with FOCUS, to arrive at a more comprehensive view of the restoration process."

FOCUS at the Eye of the Storm

OAS deals with frontline operations, such as providing information to dispatchers for issuing and recording completion details and closing orders. FOCUS is used to give storm-management people in the Storm Control Center a higher-level view of the situation.

"Our storm-management people are delighted with FOCUS," Schaeffer says. "Performance has been great. Generally, within 30 seconds, we can generate a FOCUS analysis report that helps us understand how some aspect of the storm-control effort is progressing."

The FOCUS Storm Menu lies at the center of the restoration-analysis process. Experts at the Storm Control Center use this list of FOCUS reports to help them make informed decisions. One FOCUS procedure, for example, provides summaries of call aging on each order. "We can look at call patterns in eight-hour blocks, so we can screen out unnecessary orders when we see that the resolution of a larger problem resolves a number of smaller call-ins from customers," says Schaeffer.

This and other FOCUS reports allow the Storm Control Center to manage the restoration process with optimal efficiency. "Time is of the essence in these storm situations," stresses Schaeffer. "FOCUS reports allow us to track orders by outage type and area to see where to send crews. They give us details on order call aging, so we can see where things are getting backed up. These are just a few examples. FOCUS helps us monitor the entire restoration process to make sure that things are getting done and not stacking up," Schaeffer reports.

Putting Users at the Helm

Before FOCUS arrived on the scene, the Storm Management Group did not have adequate tools to analyze major storms. "FOCUS provided the flexibility and the necessary information to make quick decisions," Schaeffer says. "What we needed was some way to generate summary information available on a corporate scale."

Achieving that goal meant finding a tool that was user-friendly and could readily provide reports based on OAS data. "Our experience with FOCUS indicated it would be ideal for quickly analyzing the vast quantity of OAS data that the Storm Management Group receives during a big

storm," says Schaeffer. "FOCUS is easy to use and allowed us to develop a suite of queries that anyone can access and run."

All PCs and 3270 terminals deployed at AmerenUE can access the OAS system. The PCs run 3270 emulation software for the core applications residing on the mainframe. FOCUS Six complements mainframe FOCUS by making it easier to download corporate data directly into PC-based productivity tools such as Microsoft Excel. "Providing canned reports on the mainframe is ideal for many users," says Schaeffer. "FOCUS Six expands our capabilities and gives us that extra edge for advanced information users."

The FOCUS Six family of products provides IT organizations with versatile desktop solutions for enterprise-wide and departmental reporting, EIS applications, data analysis, data visualization, and decision support. The various editions of the product are tailored to specific skill levels and diverse requirements for data analysis throughout an organization: a Power Edition for experienced users, a Managed Reporter Edition for novice users, and an EIS Edition for executive decision-makers.

"The inherent flexibility of FOCUS means more people can get involved in the reporting process," notes Schaeffer. "These new analysis capabilities were user-driven and required minimal help from AmerenUE's IT organization. Our people developed the FOCUS queries to produce the exact results required. The IT group created the FOCUS infrastructure and off-loaded the report generation task to the end user. It was a win/win situation for both Engineering and IT."

A Corporate Standard for Reporting

FOCUS is not only used to analyze OAS data during storms. "We have people who run FOCUS queries every morning to get a snapshot of what's going on, so they don't have to go in and page through screen after screen of detailed information," says

"FOCUS provided the flexibility and the necessary information to make quick decisions."

Schaeffer. "There's a whole group of FOCUS reports that monitor trends and workloads. For example, individual crew reports tell us how many jobs a crew member did for a given period of time."

Corporate applications such as inventory control and payroll also make use of FOCUS data analysis and decision support capabilities. In fact, FOCUS is used for a whole series of other AmerenUE applications, including reports accessing the Automated Metering Reading (AMR) system, which monitors a network of more than 550,000 electric meters daily, entailing millions of records. FOCUS reports for this system analyze the meter population and cross-reference outage information related to specific meters.

Such extensive data analysis and reporting capabilities enable AmerenUE to keep close tabs on its business. Most important, the

company can respond to storm situations much more effectively than in the past, providing heightened customer satisfaction and confidence in the utility's ability to get them back on line in the shortest possible time.

"I think the greatest thing the IT Department did for us was to give us FOCUS," concludes Schaeffer. "We can operate more independently and summarize the data to solve our own business problems. We've seen a substantial increase in our ability to analyze our business since deploying FOCUS. That increase in availability of information is crucial to us in these changing times." ♦

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Customer Profile



Wayne County Maintains FOCUS Changed the Face of Criminal Justice

"It's been proven that if we can keep people out of jail and get them into a well-structured community corrections program, they're less likely to be repeat offenders," says Jeriel Heard, Director of the Department of Community Justice. "Our Community Corrections Information System (CCIS) not only helps us administrate and track these probationary programs, it's helped us win the grant money to create additional programs to prevent crime, and it's based on FOCUS from Information Builders."

With a total population of over two million, Wayne County, Michigan, is one of the ten largest counties in the United States. The Department of Community Justice, located in Detroit, is the centralized planning, monitoring,

Snapshot

Organization: Wayne County Department of Community Justice.

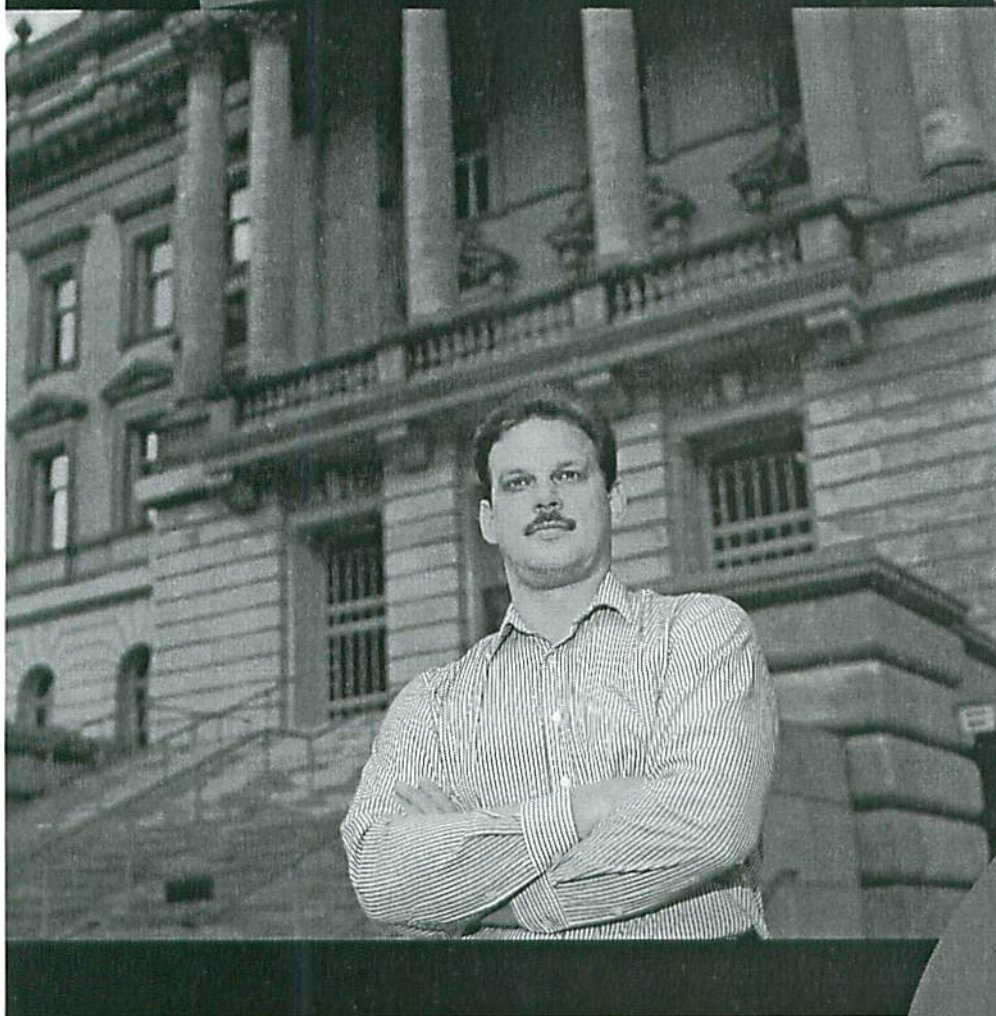
Profile: Centralized planning, monitoring, and evaluation agency for Wayne County criminal justice system.

Headquarters: Detroit, Michigan.

The Challenge: Lack of data to facilitate decision-making led to an inefficient use of resources.

Results: Automation of a central operational system enhanced decision making and improved resource efficiency.

Information Builders Tools: FOCUS, FOCUS Six.



"Our relationship with Information Builders has always been very supportive."

and evaluation agency for the entire Wayne County criminal justice system.

"We oversee the administration of all of our state community corrections grant funds," says Heard. "This includes contracts for halfway houses, day treatment programs, and our alternative workforce program, which is one of the largest community service work crew programs in the country."

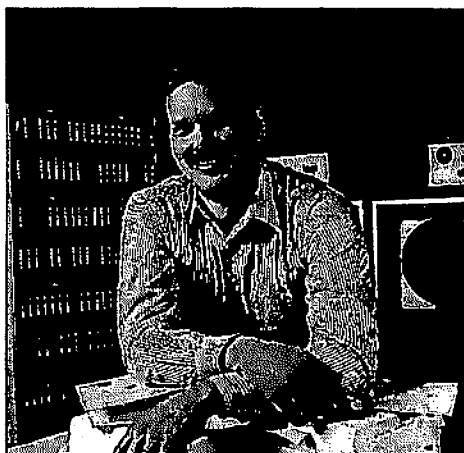
Clearly, administering programs and funding on this scale is a complex task. But until just two years ago – before CCIS – this challenging job was proving to be nearly impossible.

Automating for Quicker, Better Information

"Many of the problems in the criminal justice system are directly related to a lack of data that could facilitate decision-making," says Heard. A former police officer, Heard was brought on board by Wayne County to try to correct some of these problems. Given Wayne County's large population base and metropolitan center, the problems endemic to the criminal justice system across the U.S. were magnified here.

According to Joe Clark, Director of End-User Services for Wayne County Department of Community Justice, Heard's very first request was for comprehensive information. "He wanted to get a handle on what was going on," relates Clark. But this was not an easy request to fill. Much of the county's data was paper-based, while some groups had attempted to create their own systems to track information. These systems were very narrow in terms of the information kept, and because they were on a variety of platforms that didn't talk to each other, groups couldn't share information. "A lot of stuff fell through the cracks," says Clark.

Heard added, "We never had the comprehensive data to view, for example, how all the district courts – we have more than 20 in Wayne County – were using the jail system and the community corrections system. Resources were not being used as effectively as possible."



Thanks to Heard's request, it became imperative that Wayne County automate, and in the fall of 1995, Information Builders' Professional Services Division was called in to do the original specification gathering and design of the mainframe FOCUS database that would become the

Community Corrections Information System (CCIS).

"The system is successful because it's so comprehensive," says Clark. In fact, it is part of a vast turnaround in automating Wayne County's operations.

The Criminal Justice Data Warehouse

CCIS was designed to serve two purposes. First, it keeps track of all the offenders in community corrections programs in Wayne County and is used for billing. Community corrections program providers include halfway houses, substance abuse treatment programs, and educational facilities, and the charges associated with these are paid by Wayne County and are tracked by the system.

Secondly, CCIS is an integrated criminal justice data warehouse designed to handle complex data and research requests. It is used to do criminal justice studies and to look for patterns: crimes committed, how often, repeat offenses. Other demographic offender data such as location of residence, education, and employment status is also tracked. "Not only do we manually enter data," says Clark,

"we extract it from other systems around the state and the country – including court, jail, and prosecutors – and pull it into CCIS. FOCUS is great for this because it can read a lot of different file structures."

The resulting reports are used to apply for grant money to create additional programs to prevent crime, reduce the number of people going to jail, and reduce the repeat offender rate. "We've had a lot of success with this," says Clark. "We've received national recognition for some of our studies. Other counties around the country are starting to do similar things."

CCIS is used by a variety of groups. The primary user is Robert Mazur, MIS Coordinator for Criminal Justice, who helped Clark develop the system and is responsible for generating statistical reports. Mazur uses FOCUS Six for Windows, Information Builders' desktop reporting and decision support tool, to create these reports, which go to police chiefs, prosecuting attorneys, the Warrant Enforcement Bureau, and to management within the county.

Other users include 15 community correction service providers, who connect to the system remotely via modem. They use CCIS to enter community corrections information about individuals in their care. This information is used to generate and verify billing and to track the success of the programs.

The system is also used by the Warrant Enforcement Bureau. "If someone skips out of their community corrections clinic, or they fail to meet with their probation officer, or if an electronic tether is damaged or compromised," says Clark, "then the Warrant Enforcement Bureau gets involved. They use the system to record and track progress on finding and apprehending these people."

And how do users feel about the system? "They love it," says Clark. "Thanks to MAINTAIN and the GUI interface it provides, users find it very easy to use. They were excited when they first saw the

multiple cascading windows, the pop-up help and value lists. You can't get much closer to the look and feel of a PC-based application on the mainframe."

Professional Services Contributes Expertise

The original CCIS system was created by Information Builders' Professional Services Division. "An Information Builders consultant created the databases and initial input screens and reports," says Clark. "The consultant's contribution was invaluable in determining which data was to be included, and how the data should be organized. Our relationship with Information Builders has always been very supportive," Clark adds.

Described by one outside observer as "the most sophisticated MAINTAIN application to date," CCIS underwent a phase two development in the fall of 1996. "Once the original system was up and running, we could see where to go with it," says Clark. "Robert Mazur had been using the system and had suggestions for enhancement, so he and I started working together on it." Mazur handles data analysis for Wayne County and provides information and recommendations to management.

"We added a lot of information, put in more checks and balances, and different methods of cross-referencing," Clark relates. Dave Wattenburg, a senior analyst in the information processing department played a key role at this stage. "Dave helped us understand the type of data that was available on other criminal justice systems, and how we could integrate it and organize it effectively. For example, if a person is assigned to alternative workforce because they committed a minor crime, but they've skipped out on their probation for some other more serious crime, the system will flag that," Clark adds.

The biggest changes in the system came with Clark's extensive use of MAINTAIN. "MAINTAIN gives you the ability to write subroutines that can be reused over and

"Information Builders is a very innovative company. And FOCUS is a very solid tool that beats any other product hands down."

over," he says. "This wasn't possible with other products I'd used in the past. I really took advantage of that feature. It saved me an enormous amount of time."

Clark also used MAINTAIN to make the system fast and easy to use – and quite sophisticated. "MAINTAIN provides a very nice GUI interface. I layered about six cascading windows, which adds a lot of complexity, and CCIS has pop-up lists and context-sensitive help screens," he says. Clark also minimized the amount of reading and writing to the database by using arrays to keep the data in memory, making the application faster.

FOCUS was chosen by Wayne County after evaluating other products because it could be used for quick systems development and to provide automation for different departments. "FOCUS is excellent for the mainframe environment," states Clark. "It does a lot behind the scenes."

In developing CCIS, Clark has taken advantage of many of the newer FOCUS features, including concurrent access, which allows multiple users to update the same files at the same time, and the FOCUS Accept feature, which controls validation of data going into the database. "We use FOCALC to perform statistical calculations and we're experimenting with EDA," Clark adds.

The fact that Clark was working with MAINTAIN when it was very new posed a few challenges along the way, but overall, development went smoothly. "Information Builders provides tremendous support," he says. "It is a very innovative company. And FOCUS is a very solid tool that beats any other product hands down."

Beating the High Cost of Jail

"CCIS is nothing less than the very lifeblood of our improved operational effectiveness," says Heard, and the evidence proves that the system plays a crucial role in the success of Wayne County's alternative workforce program.

By putting offenders who have committed minor crimes of a non-assaultive nature to work cleaning up the community instead of going to jail, the county can save a substantial amount of money while freeing up jail cells for more serious criminals. "The heart of public safety is the reduction of recidivism – or repeat offenses," explains Heard. "CCIS allows us to evaluate the effectiveness of our programs in reducing recidivism and to determine whether we should invest in more."

Plus, CCIS is instrumental in obtaining federal and state grant money to fund these programs. "While other counties are talking about tracking different kinds of information, we are already doing it," says Clark. "And that's why we're getting the grant money." And once a program is started, the system allows Wayne County to take corrective action if the program is falling short of goals and objectives. "Without CCIS, we couldn't effectively administer our grants," says Heard.

All in all, CCIS has truly changed the face of criminal justice in Wayne County. "Jeriel Heard has used the reporting information to actually change things in the criminal justice system," says Clark. "It's opened people's eyes to the problems and inconsistencies that needed to be resolved." ♦

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**Information
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Customer Profile



Freightliner Corp. Keeps On Trucking With FOCUS

Freightliner Corporation, the leading original-equipment, heavy-truck manufacturer in North America and a dedicated user of FOCUS on MVS, is renowned for providing uncompromising reliability and leading-edge innovations in its trucks. This same attention to quality and innovation is one of the principal reasons the company has chosen Information Builders' products, and why it is looking to WebFOCUS for internal reporting systems in the future.

Since the first Freightliner truck appeared in 1942, the company has introduced revolutionary design breakthroughs in the trucking industry. These breakthroughs include the first use of aluminum in truck design and the first anti-lock braking systems in North America for production trucks. Such innovations and an ever-expanding product line have caused the company

Snapshot

Organization: Freightliner Corporation.

Profile: The largest original-equipment, heavy-truck manufacturers in North America.

Headquarters: Portland, Oregon.

The Challenge: Provide a cross-platform reporting system for Parts and Procurement system. Prepare for Year 2000 date compliance.

Results: Ability to access information from both mainframe and client/server environments and convert dates to Year 2000 compliance without affecting productivity.

Information Builders Tools: FOCUS, WebFOCUS, and SiteAnalyzer.



It's the facilities that come with FOCUS Six – the robust development environment, the cross-platform capabilities – that's what excited me about the product.

to capture more than 25 percent of the U.S. market and become the leading U.S. exporter of trucks since 1992. The company, based in Portland, Oregon, has Parts Distribution Centers (PDCs) and manufacturing plants all across the North American continent.

Putting Together the Right Parts

The Engineering Department at Freightliner, also located in Portland, is the driving force behind new designs and prototype truck construction. Here, prototype versions of trucks destined for general production are built and tested. One of the challenges involves effective reporting: keeping parts and parts procurement activities correlated with each specific project.

"Our Test Engineering Group needed a highly reliable and flexible system for reporting on the status of parts in the procurement process, from ordering to construction site delivery," says Erwin Feldhaus, a Freightliner Test Engineer.

The Test Engineering Group has 15 Windows NT users accessing the special parts and procurement information, a Microsoft SQL Server database running on a dedicated Windows NT computer. Freightliner needed to ensure that these users could obtain the relevant parts procurement reports easily and quickly from the SQL Server database. This need, in and of itself, wouldn't be difficult to achieve. The challenge was to access the SQL Server database and also have an efficient way to access IMS data on the corporate mainframe. They needed cross-platform access.

Feldhaus and his colleagues tackled the PC reporting problem first.

"We tried Microsoft Access for reporting, but the size of the SQL Server database caused it to run too slowly," says Feldhaus. "We also tried hard-coding Visual Basic with SQL statements, but the application was unreliable, crashed a lot, and was

also inflexible. Once you created a report, it was extremely difficult to change or upgrade it."

Visual Basic queries are coded in BASIC, and a translator turns queries into SQL for processing by an SQL database server such as Microsoft SQL Server. FOCUS, Information Builders' flagship product, by contrast, uses SQL as the foundation of all development activities – from data modeling to reporting. This enables significantly more sophistication when it comes to client/server database processing. For example, FOCUS can query multiple, heterogeneous database tables within a single transaction, without requiring any coding.

Powershifting to FOCUS Six

As one of the first MVS sites to install FOCUS on the mainframe, Freightliner had considerable internal experience using the product. The company is presently transitioning from mainframe FOCUS 7.03 to 7.06, with more than 40 departments accessing a broad range of applications from sophisticated menu-driven systems to ad hoc reports. Several systems interface with the text-based e-mail system that is used to schedule conference rooms at headquarters.

"People don't even know that FOCUS is running on the back-end, processing and updating the conference scheduling database, sending messages back to people when there are scheduling conflicts or non-availability of rooms, and so on," Freightliner Senior Analyst, Allen Doolittle says.

Because of this historical and current use at Freightliner, Feldhaus knew that it was an immensely powerful and reliable reporting system for a host of corporate applications. The MVS mainframe reporting system alone serves more than 350 people at numerous sites on the continent. Once Feldhaus learned about FOCUS Six, Information Builders' Windows-based product, he realized it would make an ideal solution for his reporting needs – on both the PC and the mainframe.

Feldhaus especially liked the rapid learning curve of FOCUS. "It was quick to learn," he says, "but this was not the main point with me. It's the facilities that come with FOCUS Six – the robust development environment, the cross-platform capabilities – that's what excited me about the product."

The FOCUS Six family of products provides IT organizations with versatile desktop solutions for enterprise-wide and departmental reporting, EIS applications, data analysis, data visualization, and decision support systems. The various editions of the product are tailored to specific skill levels and diverse requirements for data analysis throughout an organization: a Power Edition for experienced users, a Managed Reporter Edition for novice users, and an EIS Edition for executive decision makers.

Versatile Reporting Options

Today, Feldhaus and his group use two types of reports: ones that track the day-to-day status of parts procurement, which are drawn from the SQL Server database, and stock maintenance and database maintenance reports, which pull in mainframe data. "We did our main programming using FOCUS Six on the Windows NT server, and then used FOCUS Personal Agent to retrieve mainframe data and bring it to the PCs," says Feldhaus. "Basically, I packaged the reporting application, created an executable application, and distributed it to 15 employees in the group. They use it on a day-to-day basis. When I do updates, I simply copy the new executable files to their hard drives."

Feldhaus is extremely pleased with the new reporting system, which took him only three months to complete. Now that he's seen how easily FOCUS Six can access mainframe data, he plans to use mainframe information for other parts procurement reporting activities. "There's a lot more information up there that our people need," he says. "Now that we have the FOCUS Six Developer's Kit, we'll be accessing it a lot more."

Destination: WebFOCUS

Even with an effective client/server information architecture in place, Feldhaus continues to weigh other deployment options that rely on Web browsers for easy access to information. "Frankly, I don't think the client/server environment is going to be here for long," he says. "The future belongs to applications running on the Web, and I am already looking at how much effort it will take to implement Information Builders' WebFOCUS product. The idea that I can have one central version of an application, rather than 15, is very appealing. It would eliminate software distribution tasks, and the program flow would also be simpler."

If anything, Doolittle is even more excited about the possibilities for WebFOCUS than Feldhaus. "If he can see advantages in providing WebFOCUS reporting for his group of 15, all located in the same building, think of what it would mean for the 350 users who are spread out across North America, accessing our mainframe FOCUS reporting systems," notes Doolittle.

WebFOCUS Throughout Freightliner

WebFOCUS will be used to leverage some of the well-written FOCUS reporting applications to maximize their use among Freightliner users across the continent. "There are plenty of FOCUS applications that are in production at one site but not available at others," says Doolittle.

Both Feldhaus and Doolittle view WebFOCUS as an effective way to construct corporate intranet capabilities that will ultimately transcend these isolated client/server environments. "The benefits are undeniable: fewer people required to program systems, ease of management, and the ability to standardize reports for thousands of remote users," says Doolittle. "Web applications built with products like WebFOCUS are the wave of the future." ♦

SiteAnalyzer Smooths Year 2000 Date Conversion

Many companies struggle to prepare their systems for the century date turnover. Freightliner Corp. is not one of them. Software experts here are using FOCUS and SiteAnalyzer – and a bit of common sense – to transition their current systems to Year 2000 compliance.

"We've adopted an 'on-the-run' mode for discovering non-compliant dates in our active systems," says Doolittle. "SiteAnalyzer allows us to look at what is currently being run and to track old dates, building up an inventory over a period of time. Tracking only current systems is a strategic approach. We could kill ourselves going through all our libraries of archival data, which go back as far as 10 years."

Doolittle is extremely pleased with SiteAnalyzer, and not only for its capability to address the Year 2000 problem effectively. "SiteAnalyzer tracks a myriad of variables for each request – fields used, time of day, how many work statements, whether batch or interactive, and so on," he reports. "There are a number of things that we can do with that information that is extremely useful beyond the Year 2000 issue."

For now, however, the main issue is using SiteAnalyzer to prepare for the century date change. "We have got to get control of that," stresses Doolittle. "We'd all like to be free to celebrate the new millennium, not dread it."

In that regard, Doolittle sees FOCUS and SiteAnalyzer delivering a very practical and straightforward approach to getting Freightliner ready for the new millennium. "It is not entirely an automatic solution," he concedes. "But no one has an entirely automatic Year 2000 solution. What people need to look for is a workable solution that does not slow down ongoing production and productivity. We think we have found that with FOCUS and SiteAnalyzer."

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